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A REVIEW OF ENERGY FORECASTS IN WESTERN EUROPE

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ENERGY FORECASTS IN WESTERN EUROPE, A REVIEW OF:

Organization for European Economic Cooperation (OEEC), Europe's Growing Needs of Energy: How Can They Be Met?. A Report Prepared by a Group of Experts. Paris, September 1956. 118 pp., $1.25.

European Coal and Steel Community, Mixed Committee of the Council of Ministers of the High Authority, Etude sur la Structure et les Tendances de l'Economie dans les Pays de la Communaute. Preface by Pierre Uri, Director of the Economic Division. Luxembourg, March 1957, 114 pp., $1.00.

Euratom, A Target for Euratom. Reported submitted by Mr. Louis Armand, Mr. Franz Etzel and Mr. Francesco Giordani at the request of the governments of Belgium, France, German Federal Republic, Italy, Luxembourg and the Netherlands. No publisher or place specified, May 1957. 104 pp.

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Europe's growing fuel deficit is largely responsible for the existence of two of the international organizations which have been created in Little Europe in recent years: the European Coal and Steel Community (ECSC) and Euratom. It is also the cause for an increasing amount of concern on the part of Western Europe's elder international agency, the Organization for European Economic Cooperation (OEEC), and the European regional organization of the United Nations, the Economic Commission for Europe (ECE). Of these, the ECSC, Euratom, and the OEEC have published reports on the energy problem of that part of Europe within its own province; the ECE has an energy study for all of Europe in the works. All of them are concerned with projecting energy requirements and regional deficits two decades into the future -- to 1975.

The OEEC, ECSC, and Euratom reports are closely related with respect to authorship, basic statistics, and methodology. The group of experts responsible for the OEEC report include two of the "Three Wise Men" who authored A Target for Euratom as well as the Director of the Economic Division of the

ECSC. Since the six members of the ECSC and Euratom are also members of the OEEC, much the same basic data were submitted by the countries covered in the reports (and supplemented by the secretariats of the OEEC and the ECSC). The general method followed in each case was to establish an energy balance sheet for a base year for the region under consideration. Demand for energy was then calculated on the basis of projections of the gross national product. Subtracting forecasts of indigeneous production yields the "conventional energy" deficit to be filled by imports and nuclear energy.

The only evident difference in methodology among the reports is in the units and conversion factors used. There are a number of possible units in which energy may be measured: kilo-calories (kcal), hard coal equivalents (HCE), kilo-Watt hours (kWh), British thermal units (BTU), and so on. The report of the ECSC, whose business is coal, uses kcal as its unit of accounting; Euratom, whose business is nuclear energy, uses HCE, as does the OEEC. For this difference in presentation, a straightforward conversion factor is available (7,000 kcal/kg HCE), but the authors of the ECSC and Euratom documents have managed to complicate the presentation by using alternative conversion factors for hydro-electricity. In obtaining an estimate of primary energy production, the ECSC report rates hydraulic energy in two ways: (a) by dividing total production of hydro-electricity by a factor (1,230 kcal/kWh) obtained from the theoretical equivalent 860 kcal/kWh adjusted for an estimated 70 percent average efficiency[1] of hydro-electric plants; and (b) by dividing total hydro-electricity production by the calorie equivalent of the average consumption of coal per kWh in thermal

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[1] Efficiency compared with potential energy of water flow.

plants in 1955 (3,696 kcal/kWh). The Euratom report "refines" the latter concept by applying a lower factor (2,800 kcal/kWh, or 400 g HCE/kWh), corresponding to the specific fuel consumption prevalent in 1956 in modern European thermal power stations. Thus out of the same set of statistics, the two reports create (and publish) three summary tables for 1955 differing only in the conversion factor of one of the items. The OEEC report uses the same conversion factor as Euratom.

The details of the calculations carried out by the OEEC Energy Commission, set out in Appendix III of the OEEC report, indicate that three "independent" estimates were made in projecting requirements from 1955 to 1960 and 1975. The first was a projection on the basis of growth in GNP for the OEEC area as a whole, taking account of improvement in the efficiency of energy utilization. The second was an extrapolation of past trends in the various sectors of demand. The third was an estimate of the potential increase for each country from which was derived a weighted average for the entire OEEC area. In addition, forecasts were made by several international oil companies as a broad check on the Commission's results. The Commission ended up with a range of estimates. The mean estimate, a projection of the 1955 base to an index of 115 in 1960 and 165 in 1975, assumed: (a) an annual rate of growth in GNP of 3.4 percent from 1955 to 1960 and about 2.85 percent from 1960 to 1975 (i.e., an increase of 18 percent for 1955-1960 and 80 percent for 1960-1975); and (b) a ratio of the percentage increase in energy consumption to the percentage increase in GNP of 0.8 for 1955-1960 and 0.85 for 1960-1975. The figures thus yielded for the mean estimate of total requirements of the OEEC area (excluding ship bunkers) by projecting the 730 million metric tons (MT) of HCE in 1955 are 840 MT HCE in 1960 and 1,200 MT HCE in 1975. The minimum estimate, an index of 150 in 1975, is approximately

that obtained by extrapolating past trends. The maximum estimate, an index of 180 in 1975, is somewhat higher than the result of the country-by-country forecast.

Probable increases in indigenous production of the various conventional forms of energy were estimated by the OEEC's Coal and Electricity Committees, and by several of the international oil companies (for oil and gas). For atomic power, an estimate was made on the basis of the previously published British White Paper on atomic power (A Programme of Nuclear Power, London, February 1955) and extrapolated to Continental Europe. The gap between the OEEC's mean projection of Western Europe's requirements and indigenous production of conventional fuels is estimated to rise from 146 MT HCE in 1955 to 195 MT HCE in 1960 and 445 MT HCE in 1975. Filling part of the gap, the OEEC hopefully projects 80 MT HCE of nuclear power production in 1975, 75 MT HCE of it from imported nuclear fuels. The United Kingdom's program would account for 40 MT HCE.

The ECSC's monograph on The Structure and Trends of the Energy Economy of the Countries of the ECSC, one of the more turgid economic documents ever printed, is actually two separate reports bound in one cover and separated by a two-page explanation of why the figures in the two parts are not comparable. The first part is an examination of the details of an energy balance sheet set up for the years 1950-1955. The second part is a projection of energy supplies and requirements from 1955 to 1965 and 1975. But the 1955 figures which are projected in the second part bear little resemblance to any figures which can be derived from the balance sheets of the first part; and no reconciliation table is provided to nail down the two-page explanation of the discrepancy. To add to the confusion, there is a shift

in concepts as well. From the energy balance sheet, it is possible to derive final energy from total requirements; and by applying coefficients of efficiency of use, to derive useful energy. In discussing energy use by type (chemical, mechanical, and thermal), Part I presents a breakdown for final and useful energy; Part II, however, introduces a breakdown of total requirements for its projection, so that neither details nor totals can be compared between sections. None of these bits of figure-juggling affects the broad conclusions, of course; but in a document whose purpose is to present the details of a statistical calculation, the figures deserve better treatment than they have received from the authors.

One peculiar theoretical obiter dictum is tossed into the ECSC report, when it states (pp. 44-45): "Establishment of a connection between energy consumption and gross national product per capita has often been attempted. However, as shown by our Table IX, the dispersion of the figures for energy consumption per capita is much greater, among the countries of the community, than the dispersion of GNP per capita." Yet when the figures in the table are put into a scatter diagram relating energy consumption per capita to GNP per capita, the points fall into an obvious rising curve, with Italy on the low end and Luxembourg on the high end, with only France falling below the curve and the Saar falling above it.

A Target for Euratom, which is chronologically the last of the three reports under discussion, builds on the results of the other two. Energy requirements and production in the Euratom countries are accepted as estimated in the ECSC report, amended by an assumption that maximum use is made of available water power resources for electricity production (and by the conversion factor adjustment mentioned above). A comparison is made with the

OEEC forecasts by adding an independent estimate for the United Kingdom to that for the Community, and the conclusion is reached that the maximum (rather than the mean) OEEC estimate is in line with the Euratom estimate for requirements but more cautious for indigenous production.

The Euratom report focuses on the projected conventional energy deficit (requirements less indigenous production) in order to split it into the part which could be satisfied by nuclear energy production and the part which will still have to be filled by imports of conventional fuels. The stated goal is to level off energy imports of the Community at their projected 1963 level of about 165 MT HCE a year. For 1970, the nuclear power goal is a little over 40 MT HCE, the figure used by the OEEC for Continental Western Europe for 1975. All increases in energy consumption after 1963 would be met by increased production of nuclear power. It is evident, however, that even at that level of nuclear power production, Europe's dependence on imports of conventional fuels will be enormous. It is with reason that the OEEC report cautions (p. 26): "Unfortunately the popular enthusiasm aroused by this new form of energy... (has) created a false impression of the contribution that nuclear energy is likely to make to Western Europe's energy needs during the next 20 years."

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